

# PATENT SPECIFICATION



872,401

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## COMPLETE SPECIFICATION

### DRAWINGS ATTACHED

#### Conveyor System

WE, A. FREEMAN, (ENGINEERS) LIMITED, a British Company, of Talbot Works, Talbot Road, Wellingborough, Northamptonshire, and ALFRED FREEMAN, a British Subject, of the Company's address, do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention is concerned with a conveyor system of the form comprising a trackway extending in a pre-arranged path, for example an endless circuit through a workroom, a plurality of goods-transporting carriages which are adapted to run along and be guided by the trackway, a conveyor chain or the like movable along a path adjacent to that of the trackway, each of the said carriages being adapted to be detachably coupled to the conveyor chain or the like so as to be impelled thereby along the trackway.

According to the invention there is provided a conveyor system of the form referred to, wherein the conveyor chain or the like is provided at intervals along its length with apertured or recessed dogs, and each of the said carriages has a catch member for engagement with a selected one of the said dogs so as to couple the carriage to the conveyor chain or the like, the arrangement being such that each carriage may be uncoupled from the conveyor chain at required times as a result of relative movement between the associated catch member and the relevant dog to withdraw the former from the latter.

The invention is applicable to conveyor systems of the form set forth in which the conveyor runs beneath the carriage or to systems in which the conveyor is disposed on one side of the path of travel of the carriages. In the latter case the carriages may be suspended from a rail or rails con-

stituting the aforesaid trackway and disposed on one side of the path of travel of the carriages.

The said dogs and catch members of the coupling may be cooperatively formed to allow for relative uncoupling movement in more than one direction. Thus, in the case where the conveyor is located below the carriage (to which reference will for convenience, be hereinafter confined) the separation of the parts of the coupling may be brought about by relative movement either sideways or vertically.

For example, in one arrangement the catch member is constituted by a transverse member depending from the carriage and the dog is recessed to receive the transverse member. In this case the parts of the coupling may be separated by relative movement vertically to retract the transverse member from the recess or by relative sideways movement of the transverse member longitudinally out of the recess.

Thus, the uncoupling at required places or stations along the system may, in this case, be brought about by a deviation in the path of the conveyor relatively to the trackway either sideways, so as to draw the transverse member laterally out of the recess, or downwardly so as to withdraw the dog downwardly and move the transverse member vertically out of the recess.

This coupling arrangement is exploited, in accordance with a further feature of the invention, for the purpose of automatically uncoupling a carriage from the conveyor or chain anywhere along the latter when the carriage contacts an abutment at its leading end. For this purpose each carriage may be provided with means associated with the coupling for relatively moving the parts of and releasing the latter either vertically or sideways when the carriage contacts an

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abutment at its leading end.

Again, the coupling arrangement may be utilised, in accordance with yet a further feature of the invention, for shunting a selected carriage on to a branch trackway and automatically uncoupling the carriage from the conveyor.

The said recess in the dog is advantageously flanked at one or both sides by a ramp whereby the carriage can be automatically coupled to the conveyor. Thus, where a carriage is standing in the path of, but not coupled to, the conveyor, the latter will pick up the carriage when the first conveyor dog reaches the catch of the carriage, the catch member (which may be in the form of a bar) running up the relevant ramp on the dog and snapping down into the recess thereof.

In order that the invention may be more clearly understood one specific example thereof will now be described with reference to the accompanying drawings, wherein:—

Figure 1 is a side elevation of a carriage and the conveyor with parts broken away to show the coupling,

Figure 2 is an end elevation thereof,

Figure 3 is a partial side elevation taken in the same direction as Figure 1 and showing two carriages at an uncoupling station and automatic uncoupling of the abutting carriages, and

Figure 4 is a plan view of the trackway, a branch trackway and points for directing a carriage to the latter.

Referring first to Figures 1 and 2 it will be seen that the carriage has a tubular framework comprising two generally-rectangular end frames 1 and 2, each constructed from a single length of tubing, which are connected towards their lower ends by inwardly-curved tubular members 3 and 4. The carriage is enclosed on three sides by a side wall 5 and two end walls 6, the upper end of the side wall 5 being reinforced by a flat bar 7. To the lower ends of each end frame 1, 2 are secured two vertical castors 8, and, rotatably mounted on the vertical stem of each castor 8, there is a horizontal wheel 9.

The carriage is arranged to run on its castors 8 in a trough-like trunking, indicated generally at 10, constituting the tracking and having inner and outer pairs of vertical walls 11 and 12. The carriage is guided by the horizontal wheels 9 which bear against the vertical walls 11 or 12 of the trackway.

A conveyor, indicated generally at 13, of any appropriate form, e.g. a chain having pairs of laterally-spaced pivotally-connected links 14, is located midway between the walls of the trackway.

At intervals the chain is provided with a dog 15. Each of these dogs is constituted by a pair of laterally-spaced plates similar to the standard links but extending upwardly above the main body of the chain. Each of the

plates is formed with an upwardly-open recess 16, the aligned recesses 16 constituting the recess of the dog, and each plate is flanked at opposite sides of the recess 16 by inclined sides 17, 18 constituting ramps.

Turning now to the catch on the carriage, this includes an arm 19 which is pivotally connected at 20 to a downwardly-extending bracket 21 on the carriage. This arm may be downwardly-urged about its pivot by a compression spring 22. Adjacent the end thereof remote from the pivot the arm 19 is bent downwardly and is furnished with a transverse bar 23 extending for equal distances at opposite sides of the arm 19. This bar 23 is of round cross-section and is of a size to be received within the recesses 16 of the spaced plates of the dog 15.

With the carriage standing stationary on the track and with the conveyor chain 13 being driven the carriage will be automatically engaged with the next-oncoming dog 15 on the chain. This comes about by reason of the fact that the leading inclined sides 17 of the plates of the dog 15 function as ramps and lift up the catch bar 23, against the action of the spring 22, until the catch bar 23 can be engaged in the recesses 16 of the dog. The spring 22 will maintain the engagement of the catch bar within the recesses notwithstanding any small variations in the respective heights of the trackway and the conveyor chain 13.

The use of the transverse catch bar 23 as the coupling piece of the carriage has the advantage that it gives a positive coupling over a suitable transverse distance and thus allows for lateral play between the chain and the carriage during running, (e.g. caused by inaccuracies of fabrication or installation of the trunking 10) without breaking the coupling. However, the coupling bar 23 can be moved sideways out of the dog to detach the carriage from the conveyor chain as will be hereinafter described.

Referring now to the Figure 3, this shows, towards the right of the figure, an uncoupling station at which the conveyor chain 13 is lowered below the trackway 10. Thus, when the carriage coupled to the conveyor chain arrives at the uncoupling station the relevant dog 15 will be drawn downwardly and will thereby be moved out of engagement with the catch bar 23. Suitable stop means will be provided on the carriage for limiting turning of the spring arm 19 and thus limiting downward movement of the catch bar 23 to allow this uncoupling. In this way the carriage will be left stationary and the chain will, of course, proceed, being restored to its usual height immediately after the uncoupling station. When the carriage has been loaded or otherwise dealt with at this uncoupling station and is to travel forwardly along the system again, then it can simply be manually

pushed along the trackway to a location where the chain is at its normal height, so that the catch of the carriage will be automatically picked up by the next coupling dog 15 in the manner previously described.

It will be appreciated that the trunking 10 is intended to extend between desired points of a building and will, in many installations, have portions extending between the floors of the building. These portions may be rather steeply inclined and it must therefore be ensured that the carriages will not become accidentally uncoupled from the conveyor and run freely down the incline. To this end, in an inclined portion of the trunking the conveyor chain 13 is raised to such a height relatively to the trunking that the catch bar 23 will, during travel along this portion, be in its uppermost position. Thus, further upward movement of the catch bar 23 is prevented and the carriage cannot become uncoupled from the conveyor by relative displacement vertically between the catch bar 23 and the dog, 15, at least whilst the wheels of the carriage remain on the trackway.

In accordance with a further feature of the invention when the leading end of the carriage being drawn by the conveyor chain abuts against a stationary abutment, e.g. another carriage not coupled to the conveyor, the said carriage will be automatically uncoupled from the conveyor chain. This is achieved, in one arrangement shown in Figure 1, by the provision of a bellcrank 24 which is pivotally mounted for turning in a vertical plane. The lower arm of the bellcrank is slotted at 25 and is engaged with a pin 26 on the arm 19 such that upon turning of the bellcrank 24 in the direction of the arrows in Figure 1 the arm 19 will be turned to elevate the catch bar 23. Abutting against the end of the upper arm 27 of the bellcrank is a rod 28 which is slidable longitudinally in directions parallel to the trackway and protrudes at the end remote from the arm 27 beyond the leading end of the carriage, extending through the bumper bar 29 thereof. Thus, if the carriage bumps into a stationary carriage or other abutment the rod 28 will be pushed longitudinally so turning the bellcrank 24 and elevating the bar 23 to the position shown in the left hand side of Figure 3 so as to uncouple the carriage from the chain and bring the carriage to a standstill. When the uncoupled carriage ceases to be in contact with the abutment, i.e. when the latter has been removed, the action of the spring 22, in restoring the catch bar 23 to its downward position, also restores the rod 28 to its forwardly-projecting position. In a simplified arrangement the arm 19 or the catch bar 23 extends beyond the leading end of the carriage to provide a forwardly-projecting part. This part is adapted to engage an abutment on a preceding carriage,

e.g. in the form of a ramp, whereby the forwardly-projecting part of the arm 19 on the catch bar upon contact with this abutment will be acted upon directly and elevated to release the coupling.

Thus, where a plurality of carriages are brought to a standstill in abutting relation at a station, (not the uncoupling station previously referred to but on any length of trackway) the coupling bars 23 of all but the first carriage will be elevated above the height of the dogs 15 and will therefore not become engaged with the latter. However, as the leading one of these stationary carriages will not be in contact with any other carriage nor with any other abutment at its front end, the catch bar 23 of this leading carriage will be automatically engaged with the next oncoming dog 15 in the manner described above. In this way, a carriage being drawn by the conveyor will be deposited to the rear of the line of the stationary carriages, and the free dog will proceed and pick up the leading carriage.

The coupling provided by this invention is exploited, in accordance with a further feature, for the purpose of shunting a selected carriage on to a branch track. This will now be described with reference to Figure 4. This figure shows a main trackway, a portion of an adjacent branch trackway and points for directing the carriage from the main trackway to the branch trackway. Thus, the trackway walls 11 and 12 at one side of the trackway are broken away and the relevant side of the branch trackway is extended towards the main trackway at one side thereof. The inner wall 11 at the opposite side of the main trackway is also broken away for a short distance and is replaced by a wall portion 30. Between the extended wall 11 of the branch trackway and the main trackway is a deflector 31 which constitutes the portion of this inner wall and is turnable about a vertical pin 32.

A carriage is shown diagrammatically at the left hand side of Figure 4 and it will be evident that when this carriage is transversed to the right with the deflector 31 maintained in its position shown in full lines the wheels 9' will abut against the deflector 31 and will be directed towards the branch trackway, the wall portion 30 being urged by the wheels 9", against the action of the compression spring 33, to allow the wheels 9" to be diverted from the relevant side of the main trackway.

The arrangement of the coupling of this invention is such that when directed towards the branch trackway by the deflector 31, the carriage will be driven for a short distance towards the branch trackway before the coupling is disengaged by lateral displacement of the catch bar 23 out of the recesses 16.

When the carriage has been deflected

from the main trackway it will be pushed, either manually or by the next-oncoming carriage travelling along the main trackway, onto the branch trackway. Although the branch trackway may be part of another conveyor circuit, it will, in most uses of the system, merely form a siding from which the carriage, after being dealt with, can be pushed back on to the main trackway through other points.

Selection of the path of travel of the carriage, i.e. along the main trackway or along the branch trackway, will be determined by the deflector 31. The arrangement is such that if the carriage is to continue to travel along the main trackway the deflector will be left to freely turn about its pivot 32. Thus, when the wheel 9' of the carriage engages the deflector the latter will be turned about its pivot 32 into the dotted line position 31'. Meanwhile, the wheels 9" will be maintained in the main trackway by the wall portion 30 under the action of the spring 33 so as to allow the carriage to continue uninterruptedly along the main trackway. Where, however, the carriage is to be deflected towards the branch trackway the deflector 31 will be held in the full line position by appropriate abutment means.

In the present example these abutment means are constituted by a plunger 34 which is movable from an operative position in which it engages the deflector 31 as shown, to an inoperative position which allows the deflector 31 to turn. This plunger 34 may be turned by a solenoid, or by hydraulic or pneumatic means. It will be readily apparent that this plunger, and hence the deflector, can be remotely controlled manually, or automatically, by an automatic selection system such, for example, as that described in our Patent No. 723421.

#### WHAT WE CLAIM IS :—

1. A conveyor system of the form herein referred to, wherein the conveyor chain or the like is provided at intervals along its length with apertured or recessed dogs, and each of the said carriages has a catch member for engagement with a selected one of the said dogs so as to couple the carriage to the conveyor chain or the like, the arrangement being such that each carriage may be uncoupled from the conveyor chain at required times as a result of relative movement between the associated catch member and the relevant dog to withdraw the former from the latter.

2. A conveyor system according to Claim 1, in which dogs and catch members are co-operatively formed to allow for relative uncoupling movement in more than one direction.

3. A conveyor system according to Claim 2, wherein the said catch member is constituted by a transverse member depending from

the carriage and the dog is recessed to receive the catch member such that the parts of the coupling may be separated by relative movement vertically to retract the transverse member from the recess or by relative sideways movement of the catch member longitudinally out of the recess.

4. A conveyor system according to Claim 3, including at least one uncoupling station, at which the conveyor is lowered relatively to the trackway so as to break the coupling between the conveyor and the carriage and leave the latter standing.

5. A conveyor system according to any of Claims 1 to 4, wherein each carriage is provided with means for uncoupling the carriage from the conveyor when the leading end of the said carriage meets a stationary abutment, e.g. a stationary carriage.

6. A conveyor system according to Claims 2 and 5, wherein there is provided on the carriage a part which projects forwardly of the carriage and which is adapted upon contact with an abutment (e.g. another carriage) to elevate the catch bar and detach the carriage from the conveyor.

7. A conveyor system according to Claim 1, wherein the said conveyor dog is flanked at one or both sides by a ramp.

8. A conveyor system according to any of the preceding claims, in which the trackway comprises a trough-like trunking over which each carriage travels, the latter having vertical wheels arranged to run on the trackway of the trunking and horizontal wheels arranged to run against vertical walls or the trunking.

9. A conveyor system according to any of the preceding claims, including a main trackway, a branch trackway and points for selectively deflecting carriages from the main trackway to the branch trackway, thereby to withdraw the bar laterally from the recess in the coupling dog and so release the carriage from the conveyor.

10. A conveyor system according to Claim 9, wherein the points include a rotatable deflector forming part of the trackway, the deflector being turnable from one position, in which it will direct a carriage from the main trackway to the branch trackway, to a position allowing a carriage on the main trackway to continue uninterruptedly therealong.

11. A conveyor system according to Claim 10, wherein the deflector is arranged to be retained in the first-mentioned position by a movable abutment.

12. A conveyor system according to Claim 11, wherein the abutment is controlled automatically, by an automatic selection system such, for example, as that described in our Patent No. 723421

13. For use in a conveyor system as claimed in any of Claims 1 to 13, a carriage

having the features set forth in any one of Claims 1, 3, 5 or 6.

14. A conveyor system as herein described with reference to the accompanying drawings.

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## PROVISIONAL SPECIFICATION

### Conveyor System

5 WE, A. FREEMAN, (ENGINEERS) LIMITED, a British Company, of Talbot Works, Talbot Road, Wellingborough, Northamptonshire, and ALFRED FREEMAN, a British Subject, of the Company's address, do hereby declare  
10 this invention to be described in the following statement:—

This invention is concerned with a conveyor system of the kind comprising a conveyor chain or equivalent which is movable  
15 in a pre-arranged path, for example an endless circuit through a workroom, and a plurality of goods-transporting carriages which are, in operation of the system, detachably coupled to said conveyor, so as to be impelled thereby  
20 along the conveyor path, and means operable at appropriate or required times to uncouple a selected carriage from the conveyor.

By a first feature of the present invention provision is made, in a system of the kind set  
25 forth, for detachably coupling each carriage to the conveyor by a quick-release fastening comprising a depending catch mounted on the carriage and including a transverse bar, and a coupling dog on the conveyor having  
30 an upwardly-open recess which receives the bar.

The recess in the dog may be flanked at one or both sides by a ramp, whilst the catch bar on the carriage is preferably biased  
35 downwards for engagement with a conveyor dog disposed therebeneath and, when engaged in the recess of the dog from above, couples the carriage to the chain or other form of conveyor.

The catch on the carriage will advantageously depend from a spring arm, and be exposed at the lower part of the carriage so that it can be engaged with the next oncoming dog on a conveyor chain or the like running  
45 therebeneath. In this event, should the carriage be standing uncoupled on, say, a track, the chain will eventually pick it up when the first dog reaches the catch, the latter running up the trailing ramp on the dog  
50 before snapping into the recess for coupling.

The use of a transverse bar as the actual coupling piece of the carriage has a number of advantages. Not only does it give a positive coupling over a suitable transverse  
55 distance but, by having the recess open-sided, the coupling bar can be slidden out laterally to detach the carriage from the chain or the like when required. This feature can be

exploited in various ways, one of which will be described below.

It also has the advantage that it allows for lateral play between the chain or the like and the carriage during actual running without breaking the coupling. Thus, for instance, if the system comprises a trough-like trunking over which each carriage travels, for example guided by horizontal wheels arranged to run against the vertical sides of the trough and having vertical wheels arranged to run on a trackway flanking this trough, the coupling allows for lateral play between the carriage and trunking during the running.

Further, the fact that the recess in each coupling dog is upwardly open allows for the arrest of each carriage at a convenient station by arranging that the chain or the like shall, at this station, be lowered, e.g. transverse a dip so as to break the coupling and leave the carriage standing. When the carriage has been loaded or otherwise dealt with at this station and is to travel forward along the system, then it can simply be pushed along into a position in which it will be picked up by the next coupling dog.

The coupling arrangement described is also, in accordance with a further feature of the invention, exploited for the purpose of shunting a selected carriage on to a branch track.

In pursuance of this feature, there is arranged, adjacent the branch trackway, a deflecting point which can, at required times, be brought into the path of an oncoming carriage, so as to deflect the latter in the new direction. In so doing, the coupling bar of this carriage is slipped sideways out of the dog with which it has up to then been engaged, leaving the chain to travel on and the uncoupled carriage left standing. To complete the shunting on to the branch, the carriage may either be pushed by hand, or be abutted by the next-oncoming carriage.

The deflecting point will conveniently be spring pressed into the path of all the carriages moving successively along the main trackway, but yieldable out of the way, to allow the carriage concerned to pass, by each carriage unless steps are taken to hold it. In accordance with a further feature of the invention, this holding of the deflecting point, which determines the selection of the carriage to be shunted, may be dictated by

an automatic selection system such, for example, as is described in my Patent No. 723,421, the trip action of an appropriate selector or index device being to operate a  
5 reader trip mechanism to lock the point against yielding.

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COMPLETE SPECIFICATION

2 SHEETS

This drawing is a reproduction of  
the Original on a reduced scale.

SHEET 1

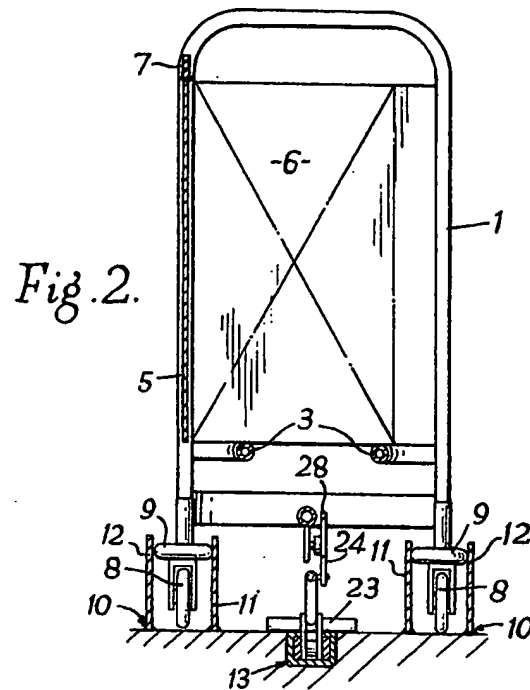
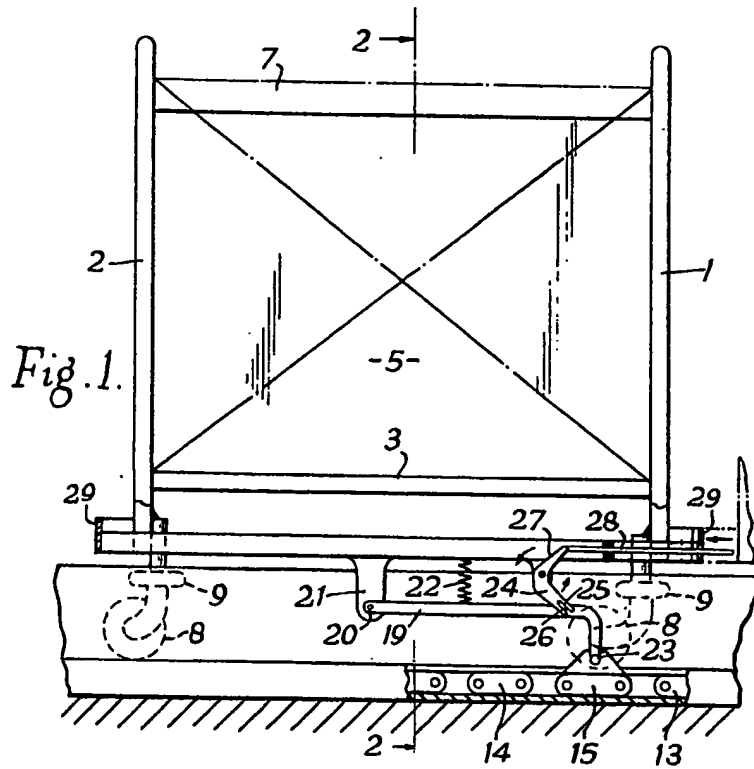


Fig. 3.

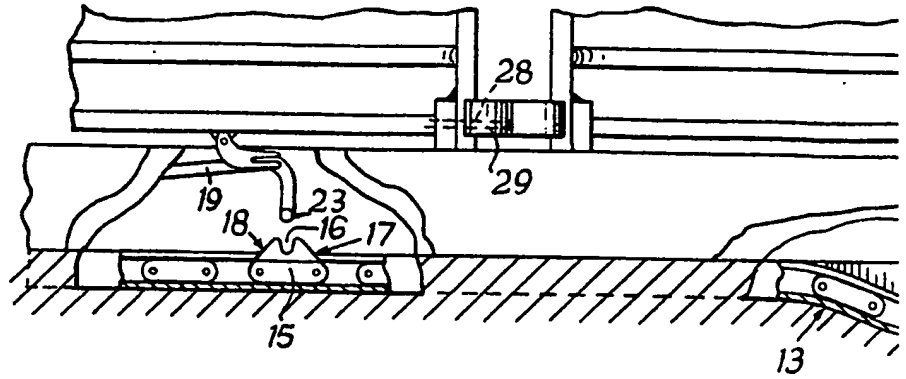


Fig. 4.

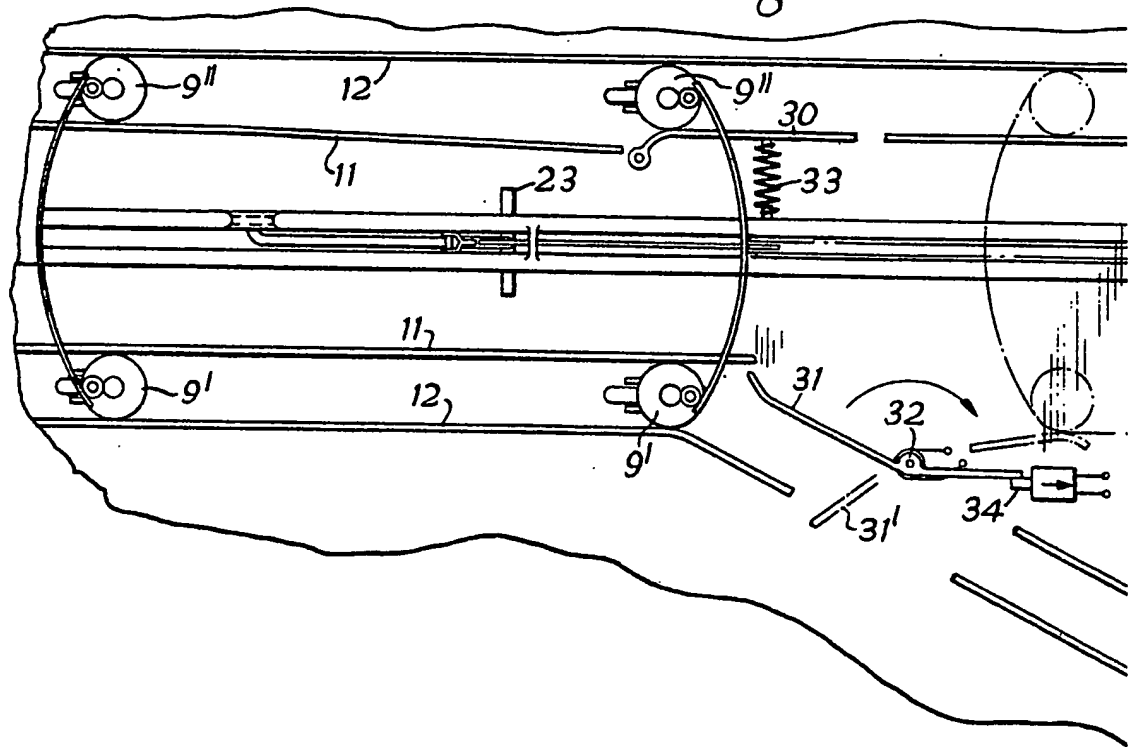
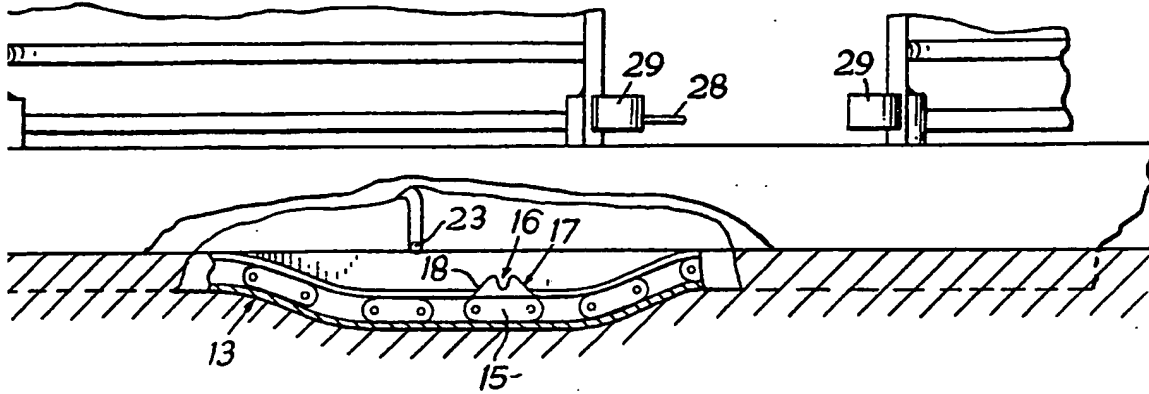




Fig. 3.



4.

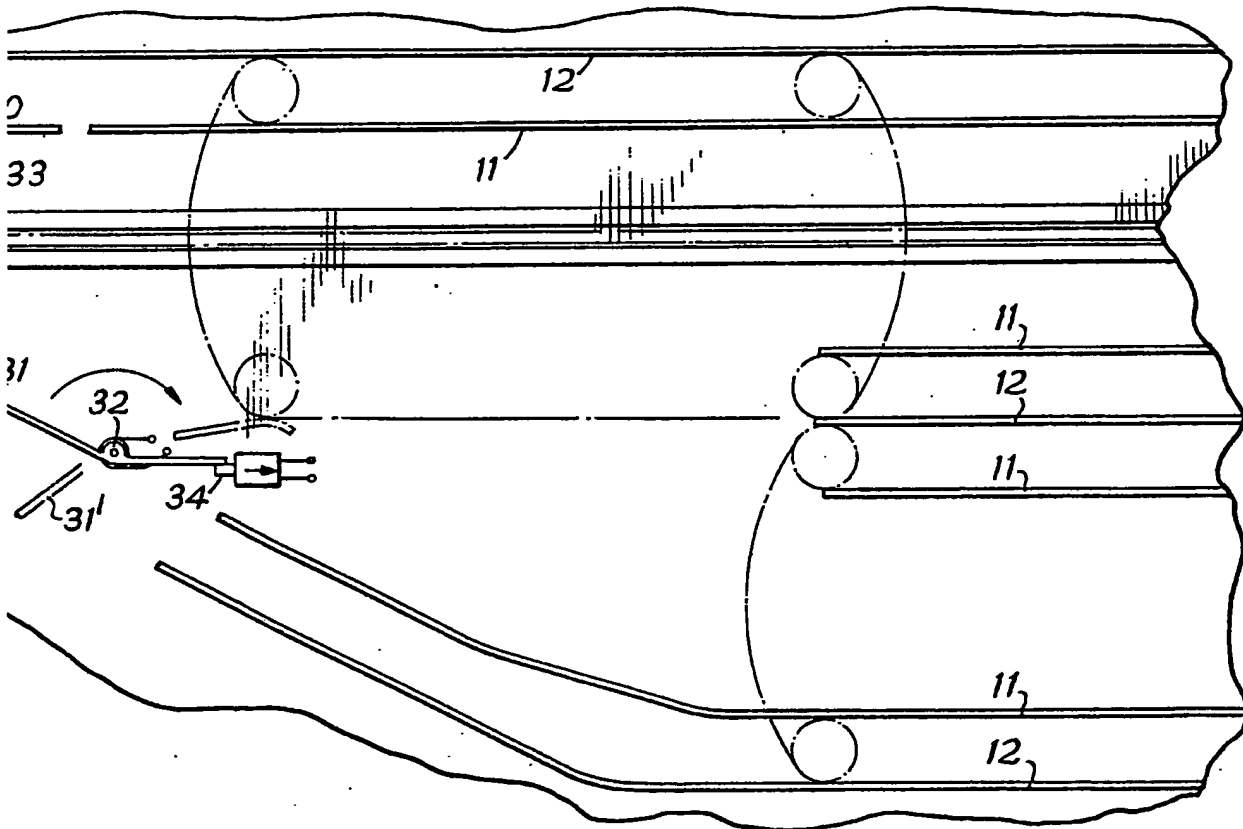


Fig. 3.

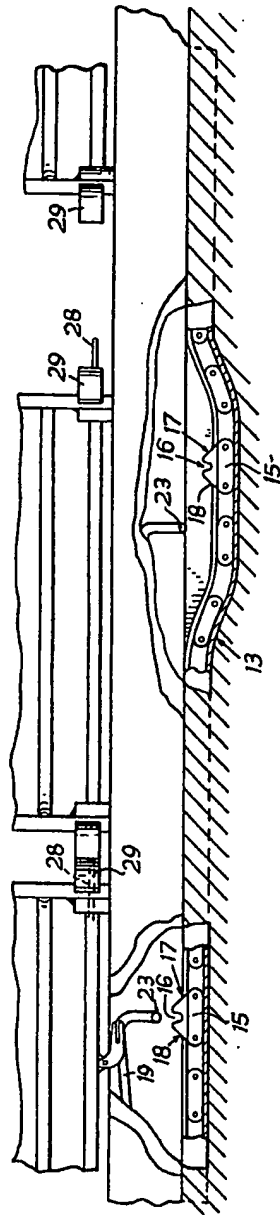


Fig. 4.

